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REMARKS

Claims 1–49 are pending in the present applicatio No claims have bee amended or cancelled, leaving claims 1–41 for considera n upon entry of the present response. Reconsideration and allowance of the claims is spectfully requested in view of the following remarks.

Claim Rejections under 35 U.S.C. 103

Claims 1—3, 5—7, 10—17, 20—24, 27—30, 32- 5 and 37—49 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable o U.S. Pat. No. 5,117,146 A to Martin et al ("Martin") in view of U.S. Pat. No. 6,553,318 2 to Mansky. (Paper 3, page 2)

In making the rejection, the Examiner has stated t "[r]egarding claims 1, 24, 27, 28, 35, 40 and 43, Martin et al. teach a screening syst for evaluating chemical or corrosion resistance using an acoustic wave sensor". (Paper 3, page 2) In making the rejection, the Examiner has further stated that

> Mansky does teach an array-based system for rapi naterials characterization using a plurality of acoustic wave nsors (see col. 37, lines 3—67). Mansky does teach that advances in mbinatorial materials science produce libraries containing a vast numbe f member chemical compounds, which need to be screened for desired erformance characteristics and material properties (see col. 1, es 6—67 & col. 2, lines 1 — 44). Therefore, it would have been obv is to one of ordinary skill in the art to provide an array-based screening stem for evaluating a plurality of materials for chemical or corrosion res ance using an acoustic wave-based sensing system, as taught by artin et al. in view of Mansky, in order to provide a screening system wh can test a multitude of materials for chemical or corrosion resistance r dly and efficiently.

Paper 3, page 3). Applicants respectfully disagree with t obviousness rejection.

The claims as presently amended are directed t a high throughput screening system for evaluating chemical resistance, comprising at l st one chemical selected from a plurality of chemicals; a plurality of materials exposabl o the chemical; a plurality of acoustic-wave devices each associated with a corresp ling one of the plurality of materials and each having a first acoustic-wave proper and a second acoustic-wave property, wherein for each of the plurality of acoustic-v ve devices the first acoustic-

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wave property corresponds to an acoustic-wave property prior to exposure to the corresponding one of the plurality of materials to the chemical and the second acoustic-wave property corresponds to an acoustic-wave property subsequent to exposure to the corresponding one of the plurality of materials to the chemical; an acoustic-wave property detector for measuring the first acoustic-wave property and the second acoustic-wave property of each of the plurality of acoustic-wave devices; and an analyzer for determining an acoustic-wave property change between the first acoustic-wave property and the second acoustic-wave property for each of the plurality of materials, wherein for each of the plurality of materials the acoustic-wave property change is correlated to a chemical resistance to the chemical. (Claim 1)

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was make. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 92 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

Martin teaches a solid-state acoustic sensor for monitoring conditions at a surface immersed in a liquid and for monitoring concentrations of species in a liquid and for monitoring electrical properties of a liquid by placing interdigital input and output transducers on a piezoelectric substrate and propagating acoustic plate modes therebetween. (see Abstract) Martin teaches making measurements in corrosion and electrodeposition sensors that are based on the change in concentration of a species immersed in a liquid. (see Col. 2, lines 41 – 65) For Martin's invention to work, it is quite clear that the corroding species must be present in a solution that is placed in contact with the acoustic wave device. For example in Col. 2, lines 44 – 51, it is explicitly stated that "the invention is practiced by adsorbing, absorbing, or plating the solution species onto a acoustic wave device surface, or by desorbing, dissolving, or

corroding a species from the device surface into solution, or by monitoring the extent and nature of acoustoelectric interactions between the acoustic wave and the solution and species in the solution". Similarly, Claim 1 is directed at measuring the concentration of a chemical species in the liquid resulting from the sorption of the species onto or desorption of species from the surface. (see Claim 1, Col. 8, lines 15 – 19) Claim 1 of the present invention, in contrast, is directed at measuring an acoustic-wave property subsequent to exposure of one of the plurality of materials to the chemical whose corrosion properties are to be detected. These materials are coated on the acoustic wave device and the change in the property of this coating (such as its mass) upon exposure to the chemical is detected and measured. In other words, the claimed invention is directed at measuring the effect of a direct interaction between the chemical to be detected and the material in contact with the acoustic wave device, based upon which corrosive properties or a change in mass is determined. Martin in contrast, requires the contacting species to be immersed in a liquid. For this reason at least, Martin does not teach all elements of the claimed invention.

In addition, Martin also teaches that measurements of the concentration of the corrosive species in the liquid are made by means of perturbations created in the liquid, which in turn changes the velocity of the acoustic plate modes. (see Claim 1; also see equations 2, 3, 4a and 4b) Since the present invention does not claim the presence of a liquid cell, the method of making measurements would not be identical with that taught by Martin. Thus, once again, Martin teaches a mode of detection that functions in an entirely different manner from that presently. Martin therefore does not teach all elements of the claimed invention.

Mansky teaches a method of material characterization that involves measuring multiple samples using multiple sensors (see Abstract). While Mansky teaches various types of characterization such as magnetic material characterization, electrical transport property measurement, it does not teach any method of material characterization that involves detecting corrosion. More specifically, Mansky does not teach detecting corrosion by a direct interaction between a corroding chemical (such as a solvent) and a material coated upon an acoustic wave device as is presently claimed. Mansky therefore does not make up for the deficiency of Martin. Further, since Martin teaches a different

mode of measuring the presence of species in solution, if Mansky were to be combined with Martin in the manner suggested by the Examiner, the resulting invention would function in an entirely different manner from that presently claimed. Since Martin requires the presence of a liquid cell into which a detecting species is solvated, one of ordinary skill in the art would not have arrived at the claimed invention by combining Martin with Mansky. Thus one of ordinary skill in the art upon reading both Martin and Mansky would not be motivated to combine them to make the claimed invention.

In addition, even if the Examiner were to maintain that there is motivation to combine the references, there is no particular expectation of success in combining the teachings of Mansky with those of Martin – such modification is merely "obvious to try", which is not the proper standard for a finding of obviousness. For example, on pages 15 and 16 of the specification, it is clearly shown how the claimed invention would perform when a polycarbonate pellet is impregnated with 500 micro liters of chloroform for only 10 seconds. The solvated polycarbonate was immediately applied as several 2-microliter droplets onto one of the sides of a 10 MHz crystal of a TSM device. The solvent then evaporated in 40 seconds, as indicated by the stabilization of the output frequency. Upon solvent evaporation, the frequency change associated with the deposited polycarbonate film was 193 Hz, and the standard deviation of the signal was 1.08 Hz. Thus, the 10 second immersion of a polycarbonate pellet into chloroform resulted in the device response with the signal-to-noise ratio of 178. The 193 Hz frequency change is the result of deposition of 170 nanograms (ng) of polycarbonate onto the surface of the acoustic-wave device. Chloroform was applied to remove the polycarbonate film. The film was removed in 100 seconds, as indicated by the stabilization of the output frequency.

Results of this experiment are shown in FIG. 3 in the specification. For the experimental results in FIG. 3, monitoring regions of output frequency during the test included the following, as indicated on the figure: A) clean crystal; B) deposition of chloroform solution onto the crystal surface after 10 seconds immersion of a polycarbonate pellet; C) 193 Hz frequency change as a result of 170 ng of polycarbonate deposited onto the crystal; D) removal of the deposited material with a solvent; and E) clean crystal. Thus, quite clearly, the deposition of the polycarbonate film containing

solvent onto the surface of the acoustic wave dev s shows clearly how the effectively corrosion properties may be measured by the claim system.

In summary, since Martin does not teach elements of the claimed invention, since combining Martin with Mansky would no ead to the claimed invention, and further since combining Martin with Mansky pr des no expectation of success, the Applicants request a withdrawal of the obviousn s rejection over Martin in view of Mansky.

Claims 4 and 31 are rejected under 3 U.S.C. 103(a) as being allegedly unpatentable over Martin in view of Mansky as ap d to claims 1 – 3, 5 - 7,10 - 17, 20 - 24, 27 - 30, 32 - 35 and 37 - 49 above, and further i view of U.S. Pat. No. 6,360,585B1 to Potyrailo et al. (Potyrailo). (Paper page 7)

Potyrailo teaches a method and apparatus or determining chemical properties based on the sequential measurement of the vari n of the oscillation frequency of a single sensing device when different chemically se itive film materials are deposited on both sides of a resonator such as a quartz crystal icrobalance (QCM). (see Abstract) While Potyrailo in Col. 1, lines 28 – 48, teaches t the resonator employed can be any type of device having vibration characteristics tha ary based on a chemical in contact with the surface of the device, it does not compen e for the deficiencies of Martin and Mansky. More specifically, it does not teach dete ng corrosion by a direct interaction between a corroding chemical (such as a solvent) a l a material coated upon an acoustic wave device as is presently claimed. Thus the c bination of Martin with Mansky in view of Potyrailo does not lead to the claim combination, and the Applicants respectfully request a withdrawal of the obviousn s rejection over Martin in view of Mansky and further in view of Potyrailo.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Martin in view of Mansky as ap d to claims 1 - 3, 5 - 7, 10 - 17, 20 - 24, 27 - 30, 32 - 35 and 37 - 49 above, and further view of U.S. Pat. No. 3,8 8,379 to Wauk, II (Wauk). (Paper 3, page 8)

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n making the rejection the Examiner has stated that

> Wauk, II does teach the use of a non-piezoelectric device, such as a cantilever device incorporating the use of non-piezoelectric ZnO (see Col. 3, line 30 - Col. 4, line 65). It would have been obvious to one of ordinary skill in the art to employ a non-piezoelectric acoustic wave device in order to provide an optimal sensing mechanism for the apparatus depending upon the response characteristics of the system under study.

(Pape , page 8). Applicants respectfully disagree.

Wauk, like Potyrailo, does not cure the deficiency of either Martin or Mansky. Thus, e combination of Martin in view of Mansky, and further in view of Wauk, does not le to the claimed combination. Applicants respectfully request a withdrawal of the reject over Martin in view of Mansky, and further in view of Wauk and an allowance of the aims.

Claims 18,19, 25, 26 and 36 are rejected under 35 U.S.C. 103(a) as being allege y unpatentable over Martin in view of Mansky as applied to claims 1 - 3, 5 - 7, 10 - 17, - 24, 27 - 30, 32 - 35 and 37 - 49 above, and further in view of U.S. Pat. No. 6,284 1 B1 to Gregorovich et al. (Gregorovich). (Paper 3, page 8)

Gregorovich, like Wauk or Potyrailo, does not cure the deficiency of either Martin or Ma ky. Thus, the combination of Martin in view of Mansky, and further in view of Grego vich, does not lead to the claimed combination. Applicants respectfully request a withd val of the rejection over Martin in view of Mansky, and further in view of Wauk and a llowance of the claims.

n summary, Martin does not teach all elements of the claimed invention. The comb ation of Martin with Mansky therefore would not lead to the present claims. Neith of Potyrailo, Wauk or Gregorovich in combination with Martin and Mansky would lead to the claimed invention. Applicants therefore respectfully request a withd val of the obviousness rejections from under 35 U.S.C. 103(a) and an allowance of the aims.

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It is believed that the foregoing remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance is requested.

If there are any additional charges with respect to this response or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Assignee.

Respectfully submitted,

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